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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/765,437	01/22/2001	Toshiya Suzuki	001764	9007

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ARMSTRONG, WESTERMAN & HATTORI, LLP  
1725 K STREET, NW.  
SUITE 1000  
WASHINGTON, DC 20006

EXAMINER

GUERRERO, MARIA F

ART UNIT PAPER NUMBER

2822

DATE MAILED: 04/12/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/765,437

Applicant(s)

SUZUKI, TOSHIYA

Examiner

Maria Guerrero

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 18 January 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-21 is/are pending in the application.
- 4a) Of the above claim(s) 7, 14 and 21 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-6, 8-13 and 15-20 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

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### **DETAILED ACTION**

1. This Office Action is in response to the Election filed January 18, 2002.

Claims 1-21 are pending.

#### ***Election/Restrictions***

2. Claims 7, 14, and 21 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim. Election was made **without** traverse in Paper No. 6.

Applicant's election without traverse of Group II, claims 1-6, 8-13, and 15-20 in Paper No. 6 is acknowledged.

#### ***Specification***

3. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

#### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 8-13 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The terms "relatively thick", "relatively thin" in claim 8 are relative terms that render the claim indefinite. The terms "relatively thick", "relatively thin" are not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the

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scope of the invention. The claim does not define what thickness is considered to be relatively thick or relatively thin.

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in-

(1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effect under this subsection of a national application published under section 122(b) only if the international application designating the United States was published under Article 21(2)(a) of such treaty in the English language; or

(2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that a patent shall not be deemed filed in the United States for the purposes of this subsection based on the filing of an international application filed under the treaty defined in section 351(a).

5. Claims 1-2 are rejected under 35 U.S.C. 102(b) as being anticipated by Sekiguchi et al. (U.S. 5,780,908).

Sekiguchi et al. teaches forming a first insulating film on a semiconductor substrate formed with semiconductor elements, forming a contact hole through the first insulating film, forming a conductive plug (tungsten), and heating the semiconductor substrate in a nitriding atmosphere to nitride the plug (Fig. 3(a)-4, col. 12, lines 5-37).

6. Claims 1-5, 8, 10-12 are rejected under 35 U.S.C. 102(b) as anticipated Saenger et al. (U.S. 5,633,781).

Saenger et al. teaches forming a first insulating film on a semiconductor substrate formed with semiconductor elements, forming a contact hole through the first insulating film, forming a conductive plug (tungsten), and heating the semiconductor substrate in a nitriding atmosphere to nitride the plug (col. 3, lines 55-67, col. 4, lines 5-55). Saenger et al. teaches forming an etch stopper layer on the first insulating film, the etch stopper covering the plug (col. 6, lines 27-50). Saenger et al. teaches forming a silicon nitride layer by CVD (col. 4, lines 1015, 27-29). Saenger et al. discloses forming a second insulating film on the silicon nitride layer, forming an opening through the second insulating film, the opening reaching the surface of the plug, forming a rare metal layer in the opening (Fig. 10-15, col. 6, lines 20-65). Saenger et al. shows forming a lower electrode (rare metal) above a semiconductor substrate formed with semiconductor elements, forming a dielectric film on a surface of the lower electrode by CVD, and forming an upper electrode (col. 4, lines 10-65, col. 5, lines 50-60).

7. Claims 15-20 are rejected under 35 U.S.C. 102(e) as being anticipated by Joo (U.S. 6,345,425).

Joo teaches forming a rare metal layer above a semiconductor substrate formed with semiconductor elements, forming an insulating mask layer (SiO<sub>2</sub>) on the rare metal layer, patterning the rare metal layer by using the patterned insulating mask layer (fig. 3B-3C, 4B-4C, col. 3, lines 60-67, col. 4, lines 1-20, col. 5, lines 65-67, col. 6, lines 1-7). Joo teaches forming a silicon oxide film by TEOS based CVD, and annealing the

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semiconductor substrate in hydrogen-containing gas (the thermal process inherently discloses this step) (col. 4, lines 60-67, col. 5, lines 1-5).

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Saenger et al. (U.S. 5,633,781) in view of Foster et al. (U.S. 5,567,243).

Saenger et al. does not specifically show the nitriding process in an atmosphere containing ammonia and being executed at a temperature of 600 ° C to 850 ° C.

However, Foster et al. discloses the nitriding process using ammonia and a temperature between 600 ° C and 850 ° C as well known in the art (col. 3, lines 25-26, col. 7, lines 29-30, col. 8, lines 15-20, col. 10, lines 10-17).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time of the invention to modify Saenger et al.'s process by including the nitriding process at a temperature of 600 ° C to 850 ° C and in an atmosphere containing ammonia in order to reduce cost (Foster et al., col. 3, lines 10-15).

9. Claims 6, 9, and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Saenger et al. (U.S. 5,633,781) in view of Applicant admitted prior art.

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Regarding claims 6, 9, and 13, Saenger et al. fails to show forming the rare metal layer first through physical vapor deposition and then through CVD using oxygen, the lower electrode having a cylinder shape. However, Applicant admitted prior art shows forming the rare metal layer by sputtering (physical vapor deposition) followed by a CVD process using oxygen. Applicant admitted prior art teaches the lower electrode having a cylinder shape as conventional in the art (pages 1-3).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time of the invention to include the formation of the rare metal layer by physical vapor deposition followed by the CVD process and using the lower electrode having cylinder shape as taught Applicant admitted prior art because Saenger et al. is using the same rare metal as show Applicant admitted prior art. The modification would provide a capacitor, which would allow good connection between the capacitor and the semiconductor elements in the substrate (col. 2, lines 15-18).

### ***Conclusion***

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Miyamoto (U.S. 6,284,649) teaches the nitriding process using ammonia as conventional in the art (col. 2, lines 5-20).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Maria Guerrero whose telephone number is 703-305-0162.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl Whitehead Jr. can be reached on 703-308-4940. The fax phone numbers for the organization where this application or proceeding is assigned are 703-308-7722 for regular communications and 703-308-7382 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

MG  
MG  
April 8, 2002

  
Stephen D. Meier  
Primary Examiner